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from one to the other are so difficult, that it is often more troublesome to cross the intervening ridges than to travel up to Crucero and thence down the valley aimed for. To these geographical features is due the importance of the seat of the capital. Sandia is the most important of the valleys, and is the one where Mr. Markham stayed the longest. Its sides are terraced with the now abandoned gardens of the Incas, and the scenery—a mixture of tropical vegetation with crags and snowy mountains and silver torrents—is described as of superb beauty. Abundant cinchona-trees are found there.

SIR RODERICK MURCHISON thought they were very much indebted to Mr. Markham for the services he had rendered. He was one of the few travellers who had examined both sides of the Andes. Mr. Markham had recently been actively engaged in transporting the cinchona or bark-plant to India, to establish plantations of it in a country where vast sums are expended in the purchase of quinine to keep in health our troops and the natives employed by us. He (Sir Roderick) could not adjourn the Meeting without warmly congratulating them on the success of the Session just ended.

The proceedings then terminated, and the Meeting was adjourned to the next Session.

ADDITIONAL NOTICES.

1. *Currents and Icedrifts on the Coasts of Iceland.* By Capt. C. IRMINGER, of the Danish Navy, Corresponding Member R.G.S.

IN the northern part of the Atlantic Ocean the surface-water sets steadily with a gentle flow towards the north. Coming, as it does, from more heated regions, and being constantly provided by fresh supplies of heated water, it maintains, as is well known, a moderating influence on the climate of the coasts which are washed by it.

Between Iceland and Norway this current takes a north-easterly direction to the Icy Sea, but without touching the extreme eastern coast of Iceland. It tempers the climate of the Faroe Islands, Shetland, &c.; and its influence is so considerable on the coasts of Norway, that harbours, even up to the North Cape (which is in about 71° lat. N.), admit shipping the whole year round, while in the coldest time of winter it is only the innermost of the smaller bays in the fiords that are covered with ice.

To the westward of the meridian that halves Iceland, the current from the south runs in a north-westerly, or even more northerly direction, until it is stopped by the current from the sea around Spitzbergen. This "Arctic current" runs south-west; it passes the north-west coast of Iceland on its way to Greenland, along whose coast it makes its way and rounds Cape Farewell. The first-mentioned current from the Atlantic Ocean washes the south-west and west coasts of Iceland, and is found to run true N. 33° W. at the rate of 1·19 nautical mile in 24 hours, throughout an area extending between W. long. 18°, N. lat. 62°, and the south coast of Iceland towards Cape Reikianæs; but, west of

Iceland, between N. lat. 64° 15′ and 65° 50′ and W. long. 23° 51′ and 25° 48′, to run N. 15° W. at 4·8 nautical miles in 24 hours.

During a protracted stay on the west coast of Iceland I have frequently been convinced of the fact, well known to fishermen there, that the current along the west coast of Iceland, in addition to a regular ebb and flood, considerably preponderates towards the north.

The annexed table, representing the temperatures of the surface of the sea in June, 1846, shows where the warmer current, running northward on the west side of Iceland, met the cold current from the Icy Sea off the north-west coast of Iceland.

	Fahr. °
1846, June 23, 6 P.M., the man-of-war brig *St. Croix*, Capt. E. Suenson, was in 65° 54′ lat. N., and 25° 5′ long. W., and found the temperature of the sea	49·1
June 24, 6 A.M., in 66° 22′ lat. N., and 26° 13′ long. W.	35·6 *
,, 9 A.M., in 66° 30′ ,, 26° 14′ ,, ...	32·5
,, noon, in 66° 17′ ,, 25° 39′ ,, ...	37·6
,, 4 P.M., in 65° 53′ ,, 25° 11′ ,, ...	46·4
,, 8 P.M., in 65° 38′ ,, 24° 17′ ,, ...	47·5

* Drift-ice in sight to the N.E.

The current which comes from the Atlantic not only moderates the climate of the south-westerly and westerly coasts of Iceland, but is also the cause why the so-called "Greenland ice," which is constantly found driving towards Greenland and along its eastern shores, does not visit the west and south coasts of Iceland. There, even if the greater part of the fiords and coves should be frozen up in a severe winter, the fishermen can keep their fishing going throughout the whole year in the two great bays, Faxe- and Brede-Bugt, because these bays never freeze up, owing to the influence of the warm Atlantic current. Again, although the days in the latitude of Iceland are very short in winter and the weather stormy, yet the vessel that carries the mail has succeeded, even in the middle of winter, in carrying on its voyages with regularity between Havnefiord (at Faxebugt) and England. It has never been stopped either by the Greenland ice or by the ice from the fiords or the coves.

Warm currents do not moderate the climate of the north-west, north, and east coasts of Iceland; on the contrary, these parts of the island are exposed to the cold currents from the Icy Sea, which frequently bring ice from the sea around Spitzbergen, by which navigation is frequently impeded to the greater part of the harbours here situated.

Though ebb and flood exist on all the coasts of Iceland, yet the current prevails from west to east near the north coast; possibly the cause of this is that a portion of the Arctic current impinges against that part of the north-west coast of Iceland which turns its face to the Icy Sea, and produces an eddy which runs to the eastward along the north coast of Iceland, in a nearly opposite direction to the principal stream of the Arctic current farther north.

Likewise, on the east coast of Iceland, the current is chiefly formed by an eddy, prevailing, in certain seasons at least, to the southward; a direction nearly contrary to the principal current, which, as before mentioned, sets to the north-east between Iceland and Norway. The wind has, however, much influence on the direction of this coast eddy; for though it is usually much easier to beat up to southward than northward through the help of this current, yet it does not escape the attention of the fishermen, who every year are lying on the fishing banks along the east coast, that the current may prevail to the north, when there is blowing weather from the south-west and south.

To give an idea of the force of the "Arctic current" I only need to call to mind some of the many whalers which, while being beset in various times, were carried along by it, together with the ice in which they were imbedded.

For instance, in 1777, many whalers were enclosed by the ice between Spitzbergen and Jan Mayen, and they were driven, while beset, in four months to Cape Farewell, a distance of 1400 nautical miles, with an average speed of between 11 and 12 miles in 24 hours.

W. Scoresby mentions (vol. i. p. 213) several cases in which ships, being beset between Spitzbergen and Greenland, were drifted along with the ice towards the south-west or south-west-by-south. One was a case in which a vessel drifted 182 miles in 13 days, giving a mean of 14 miles per 24 hours; another in 9 days 120 miles, or 13 miles in 24 hours; a third 420 miles in 49 days, or 8·7 miles; and a fourth case, 1300 miles in 108 days, averaging 12 miles per day. The mean of all these cases gives 11·9 miles in 24 hours; and it can therefore be assumed without much risk of error, that the mean rapidity of the Arctic current is 11 or 12 miles in 24 hours, at least during the season of navigation.

It is a well-known fact that the situation of the ice in the Icy Sea is subject to considerable changes from one year to another, for where an impenetrable ice-barrier was found in one year, vessels could in another year sail several degrees farther without being stopped by the ice; and, on the other hand, where the sea was void of ice one year, it might be impossible to penetrate so far north in the succeeding one.

The amount of the icedrift may thus be very different one year from another, and in proportion as the masses are greater which are carried away by the Arctic current from the Icy Sea, the more will the strait between north-west Iceland and Greenland become filled with it. Ice is nearly always met with here by fishermen, who ply every year from the harbours of the north-west coast of Iceland; they usually fall in with drift-ice in the strait between Iceland and Greenland at from 40 or 60 to 80 miles from Iceland.

This icedrift is frequently much more considerable. In such cases it fills not only the strait between the north-west coast of Iceland and Greenland, so that for long together it is impossible to round Cape Nord, but it also encloses the whole coast to unknown limits northwards and far to the eastward. To give an idea of the vast extent of an icedrift like this, I may mention that the distance between Iceland and Greenland is at least 160 nautical miles, and assuming the rapidity of the current at only 11 miles in 24 hours, it will follow on calculation that a mass of ice of not less than between 1700 and 1800 square nautical miles in area will have been carried away to the south-west every 24 hours from between north-west Iceland and Greenland.

This so-named Greenland drift-ice consists for the greater part of fields of ice, often piled on one another: these have been produced on the surface of the sea, sometimes to a thickness of 5 or 6 fathoms. Secondly, it consists of swimming icebergs, loosened from glaciers, and fallen into the sea; their size is sometimes so considerable that they have been seen grounded in more than 80 fathoms water.

When this ice, carried by the Arctic current, arrives at the coasts of Iceland, it brings with it a cold very prejudicial to vegetation. Usually the ice appears first on the coast near Cape Nord; it then drifts on the north-west coast, enclosing the fiords between Patrik's and Isefiord; and it will happen, though rarely, that part of this ice passes Fugle or Staalbierghuk, and drives in the direction of the Bredebugt. The north coast of Iceland is then more or less enclosed; a considerable drift sets down to the bay of Skagestrand, and occasionally reaches even to the eastward of Langenæs, whence the current carries it upon the east coast of the island; and as the ice on the north as well as on the east coast is usually more compact than off the north-west fiords, the navigation there is sometimes wholly impeded from January or February until the following summer-time. When there is much ice on the east coast of Iceland, it may happen that some of it will drive round the south side of the island, though this never hinders navigation to the western coast.

The quantity of the ice, as well as the periods of its coming and leaving the coasts of Iceland, are very different. Some years, a great part of the coasts are enclosed by it; other years, it does not appear at all. Very seldom it comes before January or February; most frequently it comes in spring, and sometimes a little later. It is remarkable that the ice, even when the masses which enclose the coasts of Iceland are very considerable, always leaves the coasts by August at the latest.

That not only the icedrift but also the severity of the winters of Iceland are very different in different years, is well known from ancient and recent observations. Thus the annals of Iceland state in reference to the year 1348, "The winter was so severe that the sea was frozen around the island: it was possible to ride from one neck of land to another, and all the fiords were frozen up with ice." In the year 1615 it is mentioned, "That the Greenland ice enclosed the island in such a way that seals (Vade Sæle, a species of seal following Polar ice) were caught in 'South on the Nazes;' a great quantity of bears did likewise then come to the country, and some of them were killed on the south side of it; many large vessels, which were visible from the land, perished with crew and all."

Considerable ice-drifts have occurred in recent times. From notes communicated to me by Mr. Thorlacius, living at Stikkelsholm on the Bredebugt, by Mr. Sigurdsson, and by others, I find that the Greenland ice drifted into the north-west fiords (between Staalbierghuk and Cape Nord) late in December 1858 and in January 1859, and that about the same time ice appeared on the north and east coasts of Iceland, but left them a short while after. In February and March it returned, and enclosed the shore from Staalbierghuk to Cape Nord, also the whole north coast, even to eastward of Langenæs, and, lastly, a considerable part of the east coast, whence masses of ice drove along the south side of Iceland, passing Portland and Reikianæs. The fiords from Staalbierghuk, around the whole north coast and for some distance down the east coast, were filled with Greenland ice, which froze into a single mass with the winter ice in the fiords, and in consequence the ice did not break up in the north-west fiords before May; in the bay of Skagestrand not before June.

Still it seems that there was even more ice in 1807. The annals of this year mention, in addition to nearly the same facts as those observed in 1859, that "From the most elevated mountains on the north and east coasts no open water was visible; that the inhabitants from Grimsóe, which lies more than 20 nautical miles from the north coast of Iceland, went in spring over the Greenland ice to the trading-place Ofiord, and that several pieces of that ice were carried from the east coast round the south coast, and were seen in Faxebugt and Bredebugt; a state of things which nobody could remember to have been seen before."

As icedrifts along the south coast are unusual, I take the liberty to mention some other cases, the more readily as they confirm what I have already said on the setting of the current along this part of the coast of Iceland.

Mr. Abel, who was "Sysselmand" (functionary) in Westmanoe from 1821 to 1851, writes to me as follows:—"On the 26th of May, 1826, with calm and clear weather, a great quantity of ice was discovered from Westmanoe driving with a speed of 3 or 4 miles an hour from Portland along the coast to westward. When it came near to Elleroe and Biarneroe, two little islands between Westmanoe and the south coast of Iceland, several of the icebergs grounded to the east and south-east of them, and some larger icebergs grounded to the southward of Biarneroe, in 60 fathoms water. The mass of ice entirely covered the sound between Westmanoe and Iceland, being about 8 nautical miles in width, while it was not possible to discover how far that part of the ice stretched which passed to southward around Westmanoe. The passage of this

icedrift from beginning to end lasted between 4 and 5 hours. During a continuance of calm and clear weather and a perfectly smooth sea some majestic icebergs, which had grounded, remained in their places; now and then they changed their form, when considerable pieces broke loose and plunged in the sea. At last, on the 8th or 9th of June, a high swell carried off these remaining icebergs in the same westerly direction as the former ice."

Mr. Abel mentions that the oldest inhabitants had never seen such an icedrift from Westmanoe, and that none had subsequently appeared, excepting a few fragments of Greenland ice in one year (the exact date is not mentioned, but between 1830 and 1840) and also in the year 1840. He further remarks, that during his thirty years' residence on Westmanoe he never had found it so cold as during the icedrift of 1826. The window-panes in his sitting-room were entirely frozen over during its occurrence, and it was not possible to thaw them by heat from the stove.

Undoubtedly the year alluded to by Mr. Abel as between 1830 and 1840 must have been 1834; for the present Bishop Thordersen, at Reikiavik, whom I visited at Odde very many years ago, where he was then the minister, writes to me: "During my residence at Odde, from 1825 to 1836, I saw twice from my home the Greenland ice drive between Westmanoe and the continent with considerable rapidity to westward. It was an imposing view. When the ice was first seen by the naked eye, it had the appearance of large vessels, but with a telescope I soon discovered it to be icebergs accompanied by great masses of field-ice. I can only recollect the date of one of these two years with certainty—it was 1834; the other year I have forgotten; but I recollect that when travelling to Reikiavik in the autumn of the year I do not remember (1826?) I saw at Orebak one of these icebergs which accidentally had stranded there, and which had, as well as I can remember, a height of at least 8 feet above the surface of the sea even after the heat of summer."

In 1859 an icedrift again passed Westmanoe. Some ice grounded at the entrance of the harbour and entirely blocked it for several days: this event must be considered as a very rare one.

It is not improbable that the very considerable icedrift of 1826 which, calculating from the data given above, must have covered an area of at least 200 square miles, may have been accompanied by ice-bears as well as by seals. These animals, as is well known, are found very frequently on Polar ice, and are carried away with it on its drift to the southward, and therefore it would not have been impossible that some of these animals, as in 1615, might have been killed "on the southern headlands of Iceland."

The reports of the year 1807, that some flakes of Greenland ice had been visible in the Faxebugt and Bredebugt, having come from the east coast round the south side of the island, can perhaps be explained thus: that the ice, after having passed Reikianæs and followed the run of the current in a north-north-westerly direction, was conveyed to the Faxebugt and Bredebugt by continual gales from the west.

This ice is a great rarity in the Faxebugt; but when it is known that stormy weather has influence on the usual direction of currents, and that about one-ninth of the driving ice is above the surface of the sea, and exposed to the immediate action of the wind, it may well happen that pieces of ice should appear where no such ice had previously been seen in the memory of men.

Besides repeated stays of long duration at several places on the south coast of Faxebugt, I have travelled on the south side of Bredebugt and the north side of Faxebugt; by proceeding from Stikkelsholm, travelling to Gronnefiord and Olufsvig, and going around the Sneefields-Jokul to Stappen, Budenstad, Miklaholt, &c. Everywhere I interested myself in obtaining a knowledge of the drift of the Greenland ice, and asked frequently if it was ever seen from any of

these places, but always received an answer in the negative. However, Mr. Olausen, who resided at Olufsvig during many years, communicated to me that, in 1830 or 1831, he had heard from an old man, who at that time lived at Olufsvig, that he could remember once, when a child, to have seen an iceberg stranded in the Bredebugt north of Gronnefiord. This iceberg lay grounded for some time; it came nearer the coast during a spring-tide in May, and it disappeared after the first spring-tide in June. According to the age of the informant, it is not improbable that this happened in 1777, the year when so many whalers were lost in the enormous masses of ice which were driven to south-west, between Iceland and Greenland.

I have taken the liberty of speaking minutely about the rare occurrence of ice on the west coast of Iceland, because a renowned English author has mentioned that intelligence had come to his notice that all the bays and creeks of Iceland, in 1816 as well as 1817, were filled with Greenland ice. According to the accounts given by me above, this cannot have been the case, at least so far as the Faxebugt and Bredebugt are concerned.

In recent times there are proofs that ice-bears have come with the Greenland ice to the north-west and north coasts of Iceland, where this ice is so frequent. In a letter from Mr. Thordersen I see that such an ice-bear was shot in Strande-Syssel a few years ago. There are traditions in Iceland that these bears now and then have killed cattle, and done other mischief; but usually they, like the bear killed in Strande-Syssel, have been of a peaceable nature, and it is a common saying in Iceland, that the bears constantly watch the opportunity to get off with the ice: as soon as it leaves the coast, they swim out to reach it.

According to information I have received, Iceland has been visited by the Greenland ice thirty-three times between the years 1800 and 1860 inclusive. On every occasion it came to the north coast, which was beset by it, and on nearly every occasion, during these thirty-three years, the coast between Cape Nord and the bay of Skagestrand was beset by it. Thirteen times it enclosed the *whole* of the north coast to Langenæs, and even farther to the eastward; fourteen times it lay outside the north-west fiords, between Staalbierghuk and Cape Nord, and blocked them up (either all or a few of them); thirteen times ice has appeared on the east coast, in various quantities; and in five different years ice has been driven from the east coast to the westward, along the south side of Iceland.

While travelling in North Iceland, I saw the Greenland ice from the mountains near Vellir, for the first time, on the 27th of July, 1834. I remember it was extremely clear on that day, and the sun felt very warm when riding on the paths between the mountains of the Nord-land. When I first came in sight of the Icy Sea, being unaware of the neighbourhood of enormous masses of ice, my surprise was so great that I called to my fellow-travellers who were behind me, "What a storm on the Icy Sea!" But, what I had presumed to be the foam of the waves and breakers, I soon discovered to be a quantity of the Greenland ice, by which the whole of the north coast and a considerable part of the east coast were enclosed in that year.

On my return to Reikiavik I inquired if any of the newly arrived vessels had fallen in with ice, and from many seafarers at Reikiavik, Havnefiord, and Kieblevik, I obtained the answer, that neither this year, nor at any time formerly, had they ever fallen in with ice on their voyages to or from those ports. I happened to be in Iceland both in 1826 and 1834, which were two of the five recorded years in which Greenland ice was driven along the south coast, and notwithstanding that both of these years I spent the greatest part of the summer on the south land of the island, I never heard mention that any seafaring man had fallen in with Greenland ice on the voyages between Europe and this part of Iceland, which sufficiently proves that icedrifts going along the

south coast of Iceland are such insignificant objects in the great ocean, that they do not impede navigation in any way.

I have already mentioned that experience teaches that the Greenland ice, even when it encloses the north and east coasts of Iceland in great masses, always leaves the coasts again in the course of August, if not earlier. I will now inquire into the reason of this, or at least give some hints which may throw light on the phenomenon.

1. A partial cause may perhaps be found in the melting of ice and snow on the enormous jokuls and snow-covered mountains in the interior of this great island. When travelling in Iceland in the warm season, in which the sun is nearly always above the horizon, it does not escape the traveller's attention, that the amount of melted ice and snow is very considerable, and I will try to give a proof of it. At the end of July, 1834, between Holum and Ofiord, I passed Heliardalsheden, which at the most elevated part of the road is about 2000 feet above the level of the sea. From a little glacier here, the "Svarfaraa" has its source. On following the course of this stream, a great many rivulets which all had their origin in the melted ice and snow, fell into the Svarfaraa; and in the valley, 8 or 10 miles from its source, this stream, which does not at all belong to the great watercourses of Iceland, had grown to an extremely rapid river. By considering how small is the area from which the Svarfaraa has its nourishment, we may estimate the very considerable quantity of water which is carried out into the sea from the whole interior of Iceland, by many other rapid and greater rivers, and it will not then appear improbable that the melting of the snow, which undoubtedly is greatest in July and August, and the consequent increased flow of the rivers, might contribute to remove the sea-ice farther from the coast. But if the ice from the east coast drifts out to sea within range of the principal current, which runs at a certain distance from shore, it will find its way to the Icy Sea again; for, as I have already mentioned, the principal current between Iceland and Norway is north-easterly, towards the Icy Sea. Again, if the ice which encloses the northern coast of Iceland be drifted out to sea, within range of the great current opposite, it will be carried away between Iceland and Greenland, and farther.

2. It is well known, and confirmed by the excellent charts on storms in the Atlantic, by Capt. Maury, that June, July, and August are the months in which the Northern Atlantic is least exposed to stormy weather; and as the prevailing gales in this part of the Atlantic are from the west, it is not improbable that the current coming from the south, and running between Iceland and Norway during the other months, in which the most blowy weather takes place, should, in the calm summer season, run somewhat more westerly and nearer to the eastern coast of Iceland. If so, it would contribute to remove the ice from its shores.

3. It is also well known that the limits of the Gulf Stream are very changeable in the different seasons: thus, in the meridian of Cape Race, its northern limit in winter is about north lat. 40° or 41°, while in September, when the Gulf Stream is most heated, it reaches 45° or 46°.* It is highly probable that this current changes its position within defined but wide limits, or as Maury strikingly remarks, the Gulf Stream "may be supposed to waver about in the ocean, not unlike a pennon in the breeze." These variations of its course may extend to the latitude of Iceland, or even still farther north; and perhaps a branch of this stream in the summer season may swing somewhat nearer to the east coast of Iceland, and, turning along its north coast, may thus contribute to the ice leaving its shores. On examining the temperature of the surface of the sea on the east and north coasts of Iceland, it appears undoubtedly, that the eddy of the Arctic current, along the north coast of Iceland, does not exist

* Maury's 'Sailing Directions,' vol. i. p. 99. July, 1858.

in July and August: it is therefore probable that that eddy which, during the greatest part of the year, runs towards east, is displaced in the course of the summer by the current coming from more southerly latitudes. It is likewise remarkable that the temperature of the sea, on the east coast of Iceland, is not so high as it appears to be along the north coast; and the supposition is reasonable that the warmer current, on bending in a westerly direction, passes Langenæs along the north coast, without touching the shores of East Iceland. It is well known that the surface of the sea, even in high latitudes, can maintain a high temperature. Parry found 39° Fahr. on his voyage in summer from Faroe to Spitzbergen, even in north lat. 73°, and east long. 8°, and I shall corroborate this observation by a fact observed last year.

The schooner *Fox*, Captain Sodring, left Copenhagen in February, bound to the Icy Sea; an extract of its logbook gives the following:—

OFF LINDESNÆS, IN NORWAY.

1860.	North Latitude.	Longitude from Greenwich.	Temperature of the Air.	Temperature of the Sea on the Surface.
	° ′	° ′	°	°
February 28 ..	..	..	36·5 Fahr.	37·7 Fahr.
,, 29 ..	58 32	4 22 East	38·8 ,,	38·8 ,,
March 1 ..	59 40	3 40 ,,	37·0 ,,	41·0 ,,
,, 3 ..	61 56	0 8 ,,	41·0 ,,	45·5 ,,
,, 4 ..	63 57	2 15 West	39·9 ,,	39·9 ,,
,, 5 ..	64 40	2 59 ,,	34·2 ,,	38·1 ,,
,, 6 ..	65 15	1 35 ,,	38·1 ,,	38·8 ,,
,, 7 ..	66 21	1 26 ,,	34·2 ,,	41·1 ,,
,, 8 ..	68 31	4 15 ,,	33·1 ,,	34·2 ,,
,, 9 ..	70 30	7 47 ,,	32·0 ,,	30·9* ,,
,, 10 ..	..	..	11·7 ,,	30·9* ,,

* Between ice, in sight of Jan Mayen.

By this it will be seen that the sea on its surface, near the Polar Circle, even in the beginning of March, and notwithstanding the effects of a long and cold winter, still retained a heat of 41° Fahr.: therefore it is not improbable that a branch of the warmer current is connected with the above-mentioned high summer temperatures of the north coast of Iceland, and that it possibly displaces the eddy of the cold Arctic current, and helps to remove the Greenland ice from the coast of Iceland in July and August.

I beg to call attention to this point; further observations will show if my supposition be right or not.

The thermometers used on the voyages to North and East Iceland for determining the temperatures of the surface of the sea, as well as the thermometer used by the *Fox*, were all verified and delivered by me; the observations will be found noted down in the logbooks of the different vessels, and the captains being intelligent men, who all took an interest in their work, I do not doubt the veracity of their observations.

To prove the influence which the warmer currents have on the climate of Reikiavik (though its harbour is sometimes frozen in severe winters), in opposition to the climate of Ofiord, situated on the north coast of Iceland and exposed to cold currents from the Icy Sea the greatest part of the year, I add the following Tables of Temperature of the Air:—

REIKIAVIK, 64° 9′ lat. N. (Obs. Met. in Islandiâ. Thorsteinson. Hafnia, 1839).

Winter.	Spring.	Summer.	Autumn.	Mean for the Year.
°	°	°	°	°
29·1 Fahr.	37·0 Fahr.	53·5 Fahr.	37·9 Fahr.	39·4 Fahr.

OFIORD, 65° 40′ lat. N. (Kaemtz, 1832, vol. ii., p. 88).

Winter.	Spring.	Summer.	Autumn.	Mean for the Year.
°	°	°	°	°
43·2 Fahr.	28·2 Fahr.	49·8 Fahr.	34·5 Fahr.	32·3 Fahr.

Difference in latitude .. .. 1° 31′
Difference in the annual mean temperature .. .. .. 7° Fahr.

As a proof of what kind of weather may be met with on the north coast of Iceland, even in summer, I give an extract of Scheel's meteorological observations, which are to be found in his second volume.

Station: A dwellinghouse at the inmost part of the Tharalaturs-fiord, between Cape Nord and Geirolfsgnup:—

	Morning.	Noon.	Evening.
1809.	°	°	°
August 1, gale from north-east	47·7 Fahr.	34·2 Fahr.	30·9 Fahr.
,, 2 ,, ,, ..	33·1 ,,	33·1 ,,	32·0 ,,
,, 3, increasing gale	30·9 ,,	32·0 ,,	33·6 ,,
,, 4, moderating gale	33·1 ,,	32·0 ,,	33·8 ,,

Finally, I add the observations made by Dr. Thorsteinson on the surface of the sea at Reikiavik, given me by Professor P. Pedersen, in 1855:—

Reikiavik.	Number of		Mean.	Highest.		Lowest.	
	Years.	Obs.	Fahr.	Fahr.	Years.	Fahr.	Years.
			°	°		°	
January	20	168	34·8	45·5	1833	29·8	1848
February ..	20	142	34·2	43·3	1841	30·9	1844
March	20	139	36·1	44·4	1851	30·9	1851
April	21	144	37·3	47·8	1833	32·0	1836, 1837
May	21	189	44·6	50·0	{1833, 1834, 1838, 1842}	36·5	1851
June	21	223	49·3	56·8	1833, 1843	41·0	1836
July	22	263	52·9	61·3	1833, 1843	46·6	1836
August	22	262	49·1	61·3	1843	43·5	1836
September ..	21	253	45·9	55·6	1843, 1852	38·8	1836
October	21	237	40·6	47·7	1838, 1842	28·6	1843
November ..	21	195	37·2	55·6	1844	28·6	1832
December ..	20	156	35·8	42·1	1840	30·9	1848

MEAN Temperature of the Surface of the Sea at Reikiavik.

Winter.	Spring.	Summer.	Autumn.	Year.
°	°	°	°	°
35·0 Fahr.	39·4 Fahr.	50·5 Fahr.	41·2 Fahr.	41·5 Fahr.

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2. *On a Method for determining Longitude by means of Observations of the Moon's greatest Altitude.* By WILLIAM SPOTTISWOODE, M.A., F.R.S., F.R.G.S., &c.

THE object of the following Tables is the determination of longitude from a simple sextant observation of the moon's greatest altitude. Owing to her motion in declination, the moon's greatest altitude will always exceed her meridian altitude; and when the motion is sufficiently rapid, the former, which can always be made the subject of direct observation, may be used for determining the longitude. The Tables furnish the corrections required to be applied to the observed altitude in order to reduce it to the meridian altitude. The latter quantity and the latitude being known, the declination at meridian passage is also known; and the difference between this and the declination at her nearest Greenwich meridian passage will be the amount of declination gained or lost between the two meridians. The longitude being, as usual, supposed to be known approximately "by account," the rate of motion in declination can be taken out of the 'Nautical Almanac;' and the amount divided by the rate will give the true longitude in time.

The present method does not pretend to the same degree of accuracy as those of Jupiter's satellites, and of lunar distances; but the simplicity of both the observation and the calculation may render it useful for checking the dead-reckoning of a traveller whose last chronometer has broken down, either as supplementary to more elaborate processes, or as a substitute when they are not practicable.

The mathematical theory, upon which the present method is based, has been the subject of a communication to the Royal Astronomical Society, and is published *in extenso* in their Memoirs (vol. xxix., p. 343). It will therefore be sufficient here to subjoin the final formula from which the Tables have been calculated.

FORMULA.